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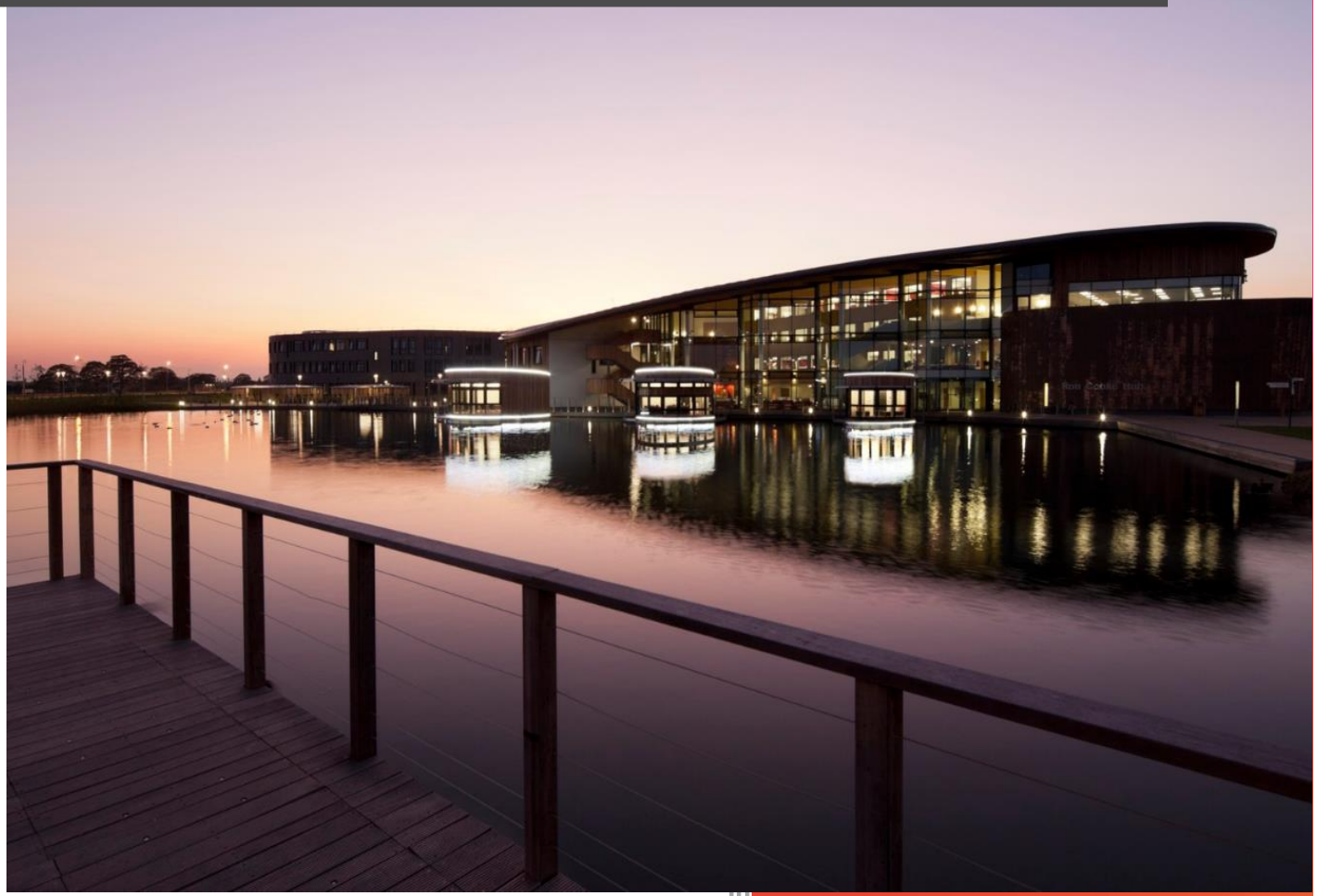
UNIVERSITY of York

How do Software Professionals Use Local Informal Meetups?



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EXECUTIVE SUMMARY

This report presents the findings of the world's first study of informal technology meetups. Local meetings organised by and for technology professionals have grown rapidly in size, reach and scope in recent years. Despite this, however, little is known about how participating in such communities impacts local professionals.

Although several platforms exist to support the formation of local groups, we limited our study to groups based that use the Meetup.com platform only, as the best-known platform. The study collected data from people who create and/or organise technology groups (through interviews) as well as people who participate in the meetings (through surveys). We selected five separate locations for our study, which together present a diverse set of UK regions. Using Meetup.com's public API, we obtained a list of all technology oriented groups in these regions, restricting our study to groups which are currently active. We invited randomly-selected group leaders to participate in an interview, and we distributed a survey to participants of further randomly-selected groups. We interviewed 12 group leaders and received 74 usable survey responses. Survey responses suggest that a majority of meeting participants are experienced, with a decade or more of experience of working in a technology field.

What motivates software professionals to participate in technology meetups? The top three motivations for attending meetings are to learn new things, develop new skills, and stay up to date. Group leaders were motivated to start a new group by a desire to learn new things, and to meet people or build supportive networks of contacts. However, the need to build a professional reputation, find technical friends, talk to people in the same field, grow the number of practitioners or make it easier to recruit skilled technical people were also important reasons to start a group.

How do software professionals make use of information they receive at meetups? Almost all participants (80%) have acquired information from a meeting that they later followed up, and a majority (69%) obtained knowledge that allowed them to make improvements to their practice. More than 75% of participants contacted someone after meeting them at a Meetup, for a variety of reasons that include sharing information about jobs, or to ask for, or offer, help. These findings suggest that local meetups are an important source for disseminating news and forming a network for support.

Do informal meetups allow software professionals to access resources or information that is difficult to get elsewhere? Interviewees described being able to talk to experienced peers in order to gain reassurance. Some also explained that attending meetings allowed unstructured, wide-ranging conversations with experienced peers that allowed them to improve their understanding or generate new ideas, in a way which other tools (like webinars, social media or blogs) do not support. These aspects of meetings may be particularly helpful for professionals working in firms where the technical team is very small, and there are few people available to discuss technical solutions or share technology news. Smaller firms might therefore benefit from supporting technical staff who wish to attend relevant meetups, either as speakers or as participants.

INTRODUCTION

This report summarises a study carried out to examine communities of technology-oriented meetups in the UK[1]. In recent years informal technology meetups have become an important aspect of the software development and technology start-up communities. In the UK, some researchers have even begun to use data about technology-oriented meetups as an indicator of the health of the local technology sector (for some examples, see references [3], [4], [5] and [18]).

Many platforms facilitate the creation of local meetings. Such platforms have been named Event-Based Social Networks (EBSNs) [13]. Examples include Meetup.com[2], which is estimated to support more than 3,500 local groups in the UK alone, attended by 1.6 million UK-based members across 263 locations. Another ESBN, EventBrite.com[3], hosted 3.9 million events in 170 countries worldwide in 2018. Facilitated by these types of platforms, new communities and groups have emerged in local regions all around the world. Although these communities cater to many different activities and interests, a large proportion are devoted to technology topics, and technology-oriented meetings at locations all around the UK now attract thousands of practitioners on a regular basis.

Despite the size of this movement, very little research has been conducted to examine the size and impact of these communities, the benefits that technology professionals gain from attending meetings, or how the growth of such communities might affect software engineering practice. This report presents the findings of the world's first study of technology-oriented meetups.

The study collected evidence to address three initial research questions:

1. What motivates software professionals to participate in technology meetups?
2. How do they make use of information they receive at meetups?
3. Do informal meetups allow software professionals to access resources or information that is difficult to get elsewhere?

[1]This report is derived partly from the following publication, under CC-BY license: Claire Ingram and Anders Drachen. 2020. How Software Practitioners Use Informal Local Meetups to Share Software Engineering Knowledge. In ICSE 2020: The 42nd International Conference on Software Engineering 2020, Seoul, South Korea. ACM, New York, NY, USA, 13 pages.
https://doi.org/10.1145/3377811.3380333

[2] www.meetup.com/

[3] https://www.eventbrite.com/blog/press/

HOW THE STUDY WAS DESIGNED

It is prohibitively time-consuming to attempt to gather data on a global scale. Instead, we have focused on collecting information from a representative list of cities in the UK. We limited our study to groups that use the Meetup.com platform only. Although other platforms exist, Meetup.com is the largest and best-known platform for regular communities, and allows us to extract some useful data (such as lists of groups in a specific region) through its public API.

The study collected data from two groups of people. The data were collected separately and then combined to create an integrated view. These groups are:

- People who create and/or organise technology Meetup groups. This is a relatively small group of people, so we collected information through interviews, which allow us to collect rich data with lots of explanatory details.
- People who go along to participate in the meetings. This is a much larger group of people, so we collected information through an online survey. A survey does not collect very rich data but it does allow us to collect inputs from a large range of people.

CHOOSING REPRESENTATIVE LOCATIONS

Location is likely to be an important factor affecting how Meetup groups operate. This is because regions differ in terms of their regional specialisms, relative populations of large, medium, small or micro-businesses and survival rates for technology-oriented firms. Differences like these could result in very different patterns of networking and participation in meetings, which means that if we simply choose one city for our study we might be seeing patterns that are specific to that one city.

We want to reduce the possibility that we inadvertently introduce a bias into our study and therefore we selected five separate locations for our study, which together present a diverse set of regions. To select these regions, we built on previous research conducted by the UK-based innovation charity NESTA[4], which has analysed economic data (and statistics from Meetup) to identify almost 50 regional clusters in the UK that are strong in creative industries like software development [3]. NESTA researchers divided these clusters into five different *types* of cluster, and listed examples of each type. We selected five of these example cities, each one representing a different type of cluster. The cluster types and our selected example cities are as follows (cluster definitions are all taken from [3]):

- CREATIVE DISTRICTS are dominated by a diverse range of creative micro-businesses. We selected as an example Brighton, in the south east of England
- CREATIVE CONURBATIONS have high survival rates for creative and technical firms, relying on high-growth firms for job creation more than other types of clusters. As an example, we selected Peterborough, which is in the UK's east midlands

[4] https://www.nesta.org.uk/

- CREATIVE CAPITALS feature large and medium creative firms and a relatively high proportion of high growth businesses. We selected Glasgow as an example, the largest city in Scotland
- CREATIVE CHALLENGERS are young clusters, with diverse business ecosystems and some high growth firms. We selected Newcastle upon Tyne in the north east of England
- INCIPIENT CLUSTERS are recently emerging clusters. We use Liverpool, a city in the north west of England, as an example

IDENTIFYING RELEVANT MEETUP GROUPS

We obtained a list of local Meetup groups for each of our five cities. Data were extracted between May and June 2019 using Meetup's API console[5]. For each of the five cities, we obtained a list of all groups located within 25 miles, limiting the search to groups classified with the topic "Technology". We also extracted data about these groups' recent activities, including the number of meetings that each group had hosted in the previous 12 months. This initial list included 255 technology groups in total.

Our study focuses on active meetup groups, so we next eliminated all those groups which had not hosted an event in the prior twelve months (if a group had scheduled an event and subsequently cancelled it we did not count this as holding an event). The new list of active groups totalled 152 groups across all five regions.

Groups that are classed on the Meetup.com platform as "Technology" groups span a wide range of interests and activities. For the purposes of our study, we are interested in studying Meetup communities specifically relevant to software development and technology delivery. We looked at each group's public topic classifications, read their group descriptions and searched agenda of recent meetings, and then we eliminated any groups from our list if we couldn't find evidence that their interests included aspects of technology delivery and/or software development.

The new list consisted of 143 active "Technology" groups across all five cities. The complete list of all groups in our study population is also available in the Appendix.

[5] https://secure.meetup.com/meetup_api/console/

PART ONE: INTERVIEWING GROUP LEADERS

Part one of our study involved collecting information from group founders and leaders. We used semi-structured interviews. A semi-structured interview protocol provides a flexible format, which starts with a list of questions to form the basis for the interview, but also permits following up of any new topics that emerge.

We randomly selected 33% of the active groups in each city, contacted the group leaders and invited them to participate in an interview. In total we contacted 48 group organisers. Twelve group organisers responded and agreed to be interviewed (a response rate of 25%). In total we interviewed 8% of all the group leaders across all five regions.

PART TWO: SURVEYING GROUP MEMBERS

Part two of our study involved collecting information from group participants. We used an online survey to collect their inputs. We asked respondents to rate their agreement on a 5-point "Likert" scale (*Strongly agree; Agree; Neither agree nor disagree; Disagree; Strongly disagree*) with some statements about Meetup groups, and we also recorded where they attended meetups and asked them about their professional experience.

We distributed the survey to 15 randomly-selected Meetup groups in our population, which had not been previously contacted with an interview request. We promoted the survey on Meetup groups' discussion boards, Slack channels, Facebook pages or Twitter accounts. We also promoted the survey generally on social media, explaining that we were looking for respondents who attend technology meetups in specific cities. We received 74 usable responses from the survey.

FINDINGS

Here we present the results of our surveys and interviews. We start by characterising what we observed about the population of Meetup groups themselves.

WHAT DO TECHNOLOGY MEETUP GROUPS LOOK LIKE?

SPECIALIST TOPICS Groups are free to self-identify their major areas of interest. Some groups focus on low-level, specific topics while others are more generalist. There's considerable overlap in groups' interests. The types of topics that different groups in our population publicly identify as their main area of interest include the following:

- Agile projects
- Architecture
- Bitcoin and/or Blockchain
- Business analysis
- Content management and/or specific CMS solutions
- Data science, AI and/or machine learning
- Databases and/or specific database solutions
- Developer tools
- DevOps
- Cloud computing
- Ecommerce
- General technology topics
- Idea generation, brainstorming and new product development
- IoT and/or embedded computing
- Mobile development
- Programming/coding, including language-specific groups
- Project management
- Security
- Search engine optimisation
- Technology startups
- Testing
- UI and user experience
- Video games
- Web development

It is difficult to state accurately how many groups are dedicated to each topic, because Meetup's suggested topics overlap significantly, separate groups interpret topics differently, and individual groups might span many topics. However, after looking at all our groups' listed topics and self-descriptions, we identified that at least 45 groups in our population appeared to focus on programming - either programming in general, or a specific programming language such as PHP or Java. This makes programming the most popular topic for groups in our population. The second

largest category of groups are those focused on data science, AI and/or machine learning; we identified that at least 18 groups focused on some or all of these topics across the whole population.

GROUP SIZE Individuals who wish to attend an event advertised through Meetup.com are prompted first of all to join the group which is organising the event. Group members are then notified whenever the group proposes more events in future. For most groups only a subset of total members attend each specific event.

Groups in our population vary significantly in terms of number of members, as shown in Figure 1.

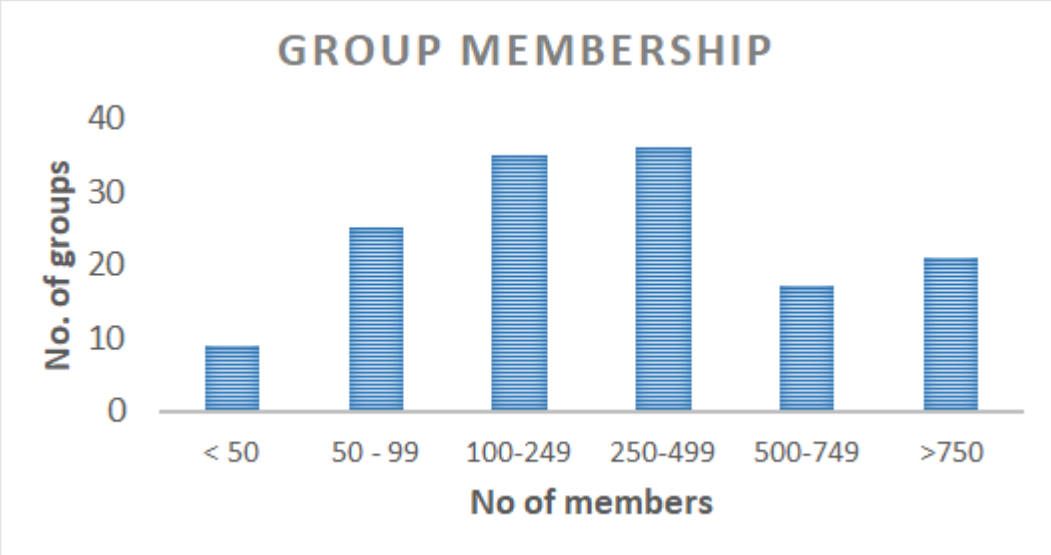

Figure 1 Distribution of Meetup groups sorted by total number of members

Note that group membership size varies continually, as individual members can opt in or out of membership at any time. Data used for Figure 1 was correct at time of extraction (May/June 2019).

WHO ATTENDS MEETUP GROUPS?

We asked our survey participants about themselves and their experience in the technology sector. Firstly, we asked whether the technology topics of the Meetup groups was relevant to their career. We offered four basic options for responses:

- *I work in technology at the moment*
- *I'm a student studying technology*
- *I don't work in technology at the moment but I think this will be useful for my career*
- *It's not linked to career, I'm just interested*

Results for this question are shown in Figure 2.

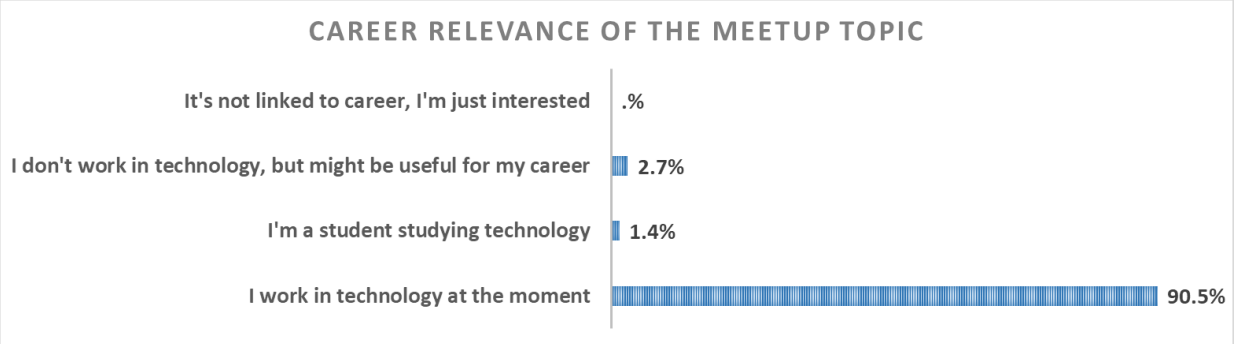

Figure 2 Responses from survey participants describing the role of technology for their career

We also asked respondents how long they had been working in technology. Figure 3 shows the results, which indicate that participants are distributed across different experience levels (in Figure 3 we have separated out those with <10 years experience into more fine-grained groups, while those with higher levels of experience are grouped into wider categories). Just over one third (36.6%) of respondents have under 11 years of experience, and a slightly smaller number of respondents (33.8%) have 11-20 years' experience. However, despite this, the majority of our survey sample who provided information (58.1%) have at least 11 years of industrial experience.

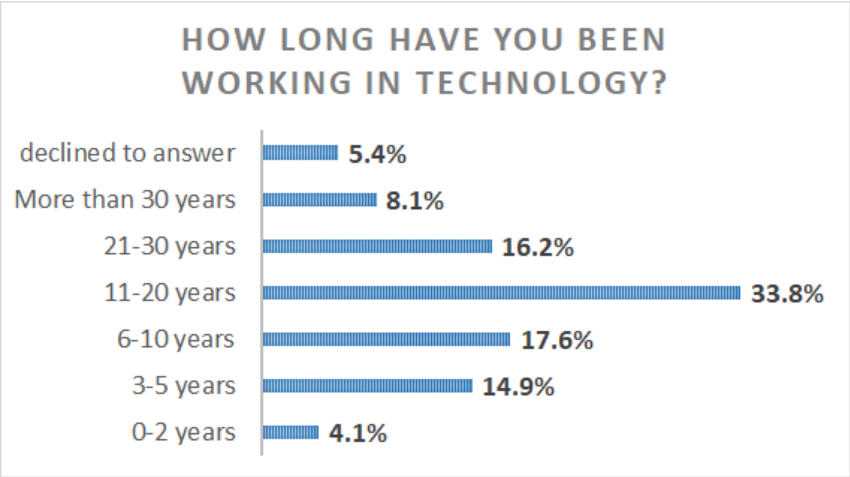

Figure 3 Distribution of survey respondents sorted by years spent working in technology

WHAT MOTIVATES TECHNOLOGY PROFESSIONALS TO ATTEND A TECHNOLOGY-ORIENTED MEETUP?

There are two aspects to the question of what motivates technology professionals to attend meetups:

1. What motivates the group leaders/founders to give up their time to create and/or lead a meetup group?
2. What motivates group participants to give up their time to attend group meetings?

WHAT MOTIVATES GROUP LEADERS?

We look firstly at the motivations of group leaders, gathering information through interviews. Most group leaders naturally had more than one reason why they had decided to get involved with running a local Meetup. Two major themes emerged from the interviews.

Firstly, wanting to **learn new things** was a major motivator for many group leaders, with seven interviewees mentioning that they found it an important motivator or benefit for being involved. A desire to **meet people** or **build a network** of contacts, was a second important motivator; seven group leaders mentioned this.

There were many reasons why group leaders wanted to build out their network. Some of these included:

- Building a professional reputation (6 interviewees expressed ideas along this theme)
- Finding friends with shared interests (5 interviewees)
- Creating opportunities to talk to people in the same field (5 interviewees)
- Increasing the number of practitioners with a particular specialism (5 interviewees)
- Supporting recruitment, e.g., by raising the firm's profile with practitioners (5 interviewees)
- Meeting new people after moving to a new region (3 interviewees)

Four interviewees explained that they found it **reassuring to talk to peers** with similar jobs. Their comments suggested that it was reassuring to find that others experienced similar challenges, and being able to talk to experienced peers was helping when it came to designing and implementing solutions. For many interviewees this was an unanticipated benefit of the meetup community, while others explicitly set up their group in order to facilitate these types of connections.

Other motivations that interviewees mentioned for founding a new group or joining an existing leadership team included:

- "Putting back" into a community, or offering support like coaching or mentoring (2 interviewees mentioned ideas along this theme)
- Wanting to help improve a particular meetup community (1 interviewee)
- A desire to stretch oneself and develop as a professional (3 interviewees)

Half the interviewees explained that they had looked for a community or group in their area (for example, perhaps after discovering some interesting new technology or practice, or after attending a

meeting elsewhere). Finding that the desired community didn't exist locally, ultimately they had solved the problem by creating the local community that they were looking for.

WHAT MOTIVATES GROUP PARTICIPANTS?

Next, we look at the motivations of group participants. We collected information here by survey. We asked survey respondents to rate their agreement with a range of different statements that might explain motivation, and also gave them space to write their own comments. The statements in the survey were influenced by various sources, which includes:

- blogs and academic articles about knowledge exchange and learning for software professionals
- informal discussions at Meetup groups which took place before data gathering started
- interviewing Meetup group leaders

The results of the survey's questions about motivations for participating are shown in Figure 4.

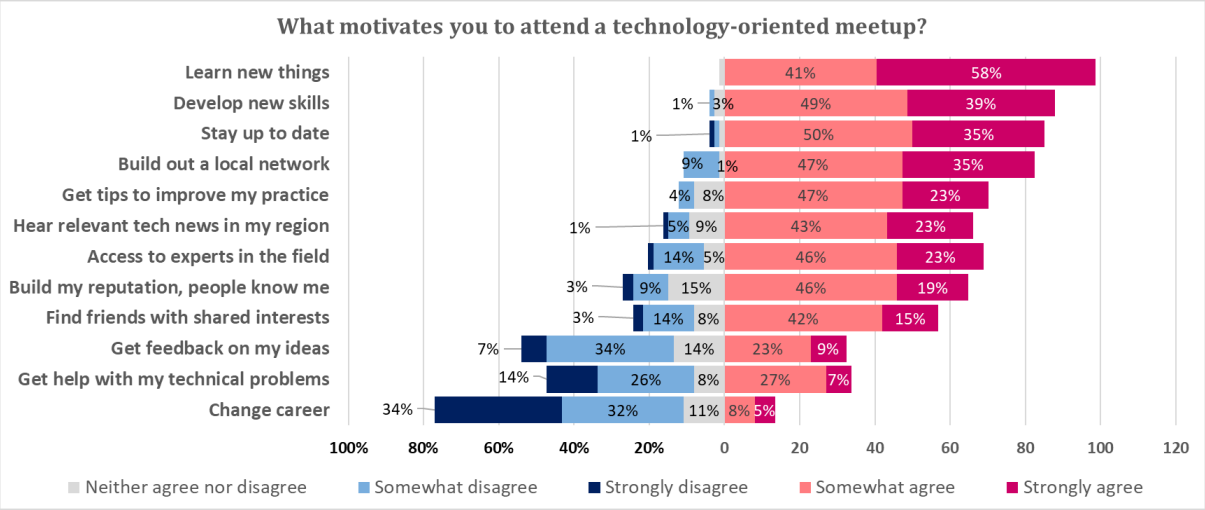

Figure 4 Survey responses showing what motivates group members to participate in meetups

In general, collecting the latest information is an important motivator, with most respondents agreeing that **learning new things, developing new skills** and **staying up to date** are the most important factors. **Building out a network** of local contacts and more **general improvements to practice** are also important. We discuss all of these in more detail in the following sections.

HOW DO TECHNOLOGY PROFESSIONALS USE KNOWLEDGE GAINED FROM MEETUPS?

We asked survey respondents two questions to get insight into the question of how professionals exploit any new knowledge they acquire at meetups:

- Have you ever contacted anyone after meeting them at a meetup?
- Have you ever applied things that you have learned at a technology-oriented meetup?

We asked the same questions of our interviewees.

APPLYING KNOWLEDGE FROM A MEETUP

We asked interviewees (i.e., group leaders) if they had ever taken away some knowledge from a meetup and applied it. All our interviewees responded that they had – whether from the meetup that they led, or from other meetups they had attended.

Several interviewees explained that meetups provided a useful channel to hear about new upcoming technologies or practices. They could follow up on the new topic subsequently to get more details. Some interviewees explained that being able to hear from a range of people meant that they were more likely to hear of interesting things slightly outside their own area of expertise, that they might otherwise have overlooked.

> *"In terms of things that I've applied, yes, there are tips that I've picked up from every one that I've been to. And I'll then go back and revisit some work I've done at work and see how I can work that new tip into it, to make it better."*
> **Meetup group leader**

Other interviewees provided specific examples of things that they had implemented following discussions at meetups. These included:

- Experimenting with choice of programming languages
- Changing the way that requirements were elaborated, after hearing how other practitioners had successfully reduced re-work
- Improving requirements elicitation and business process analysis through re-visiting information gathering techniques
- Presenting technical information to decision-makers

These examples all exhibit features of sharing implicit knowledge. Implicit knowledge is acquired through experience or through observing other experienced practitioners [8, 19], and it's tied to specific applications and working context [14]. It is thought to be very important for software development. For example, developers typically improve their skill through practical experience of creating and maintaining software applications, and project managers improve their ability to foresee and resolve problems through experience of delivering projects. This type of knowledge is implicit because it is commonly taken for granted, involves a complex mix of "soft" and technical skills, and generally not written down. This makes it difficult to transfer to other people. The best chance of transferring it exists in face-to-face discussions that allow participants to drill into details, ask questions that reveal missing contextual details, and expose assumptions.

The results from the survey respondents when asked the same question are shown in Figure 5. Respondents could select as many answers as they liked, except for "No" which was an exclusive option.

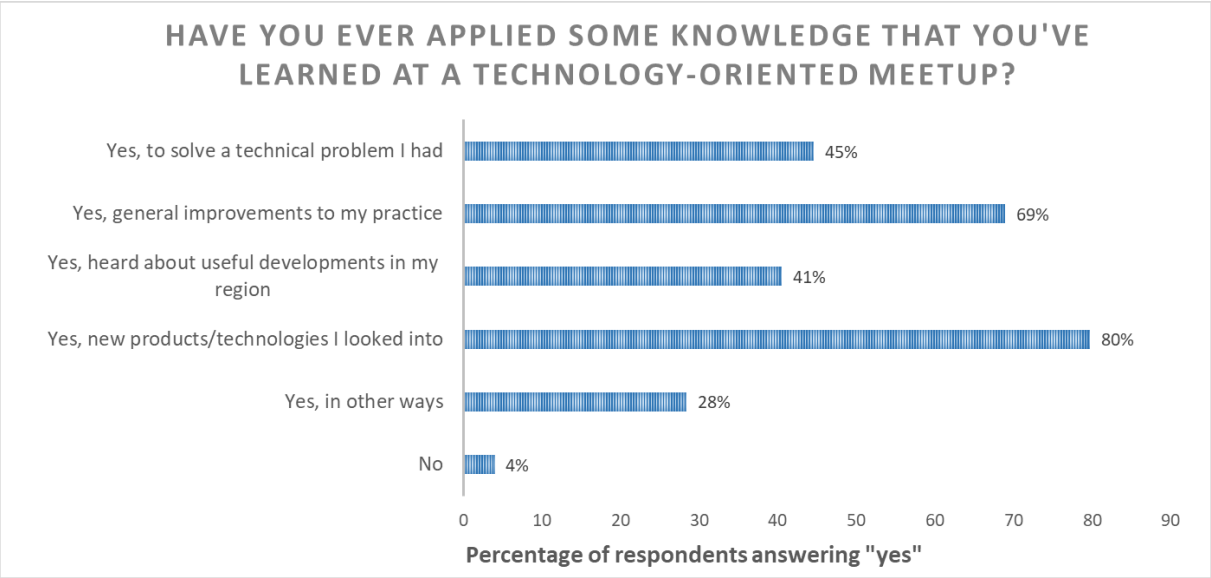

Figure 5 Survey responses indicating how participants apply knowledge that they learn at a meetup

A majority of respondents have acquired knowledge about new technologies or news that prompted them to take further action (80%), or learned something that resulted in improvements to their practice (69%). We observe that these results broadly echo the responses of our interviewees, who also found that meetups were a useful source of news to follow up later, or tacit lessons learned from experience which result in practice improvements.

Survey respondents also suggested other ways in which they had used new information from meetups. These included:

- Disseminating new information to other communities (3 people)
- Improving their own communications (2 people)
- Generating new ideas or initiating strategic side projects (2 people)
- Making sales or obtaining work (1 person)
- Personal career development (1 person)

CONTACTING PEOPLE AFTER A MEETUP

We asked interviewees (i.e., group leaders) if they had ever got in touch with someone after meeting them at a meetup. The overwhelming majority of interviewees (10) have done this. Many commented on the importance of making friends or building a friendly local network.

> *"I've probably used [the meetup] to make friends and a network as much as anything else."*
> **Meetup group leader**

The results from the survey respondents when asked the same question are shown in Figure 6. Respondents could select as many answers as they liked, except for "No" which was an exclusive option. Just over 75% of all survey respondents have contacted someone after meeting them at a meetup. This is consistent with other studies of Meetup (not restricted to technology groups), which also found high rates of interaction after meetings [17].

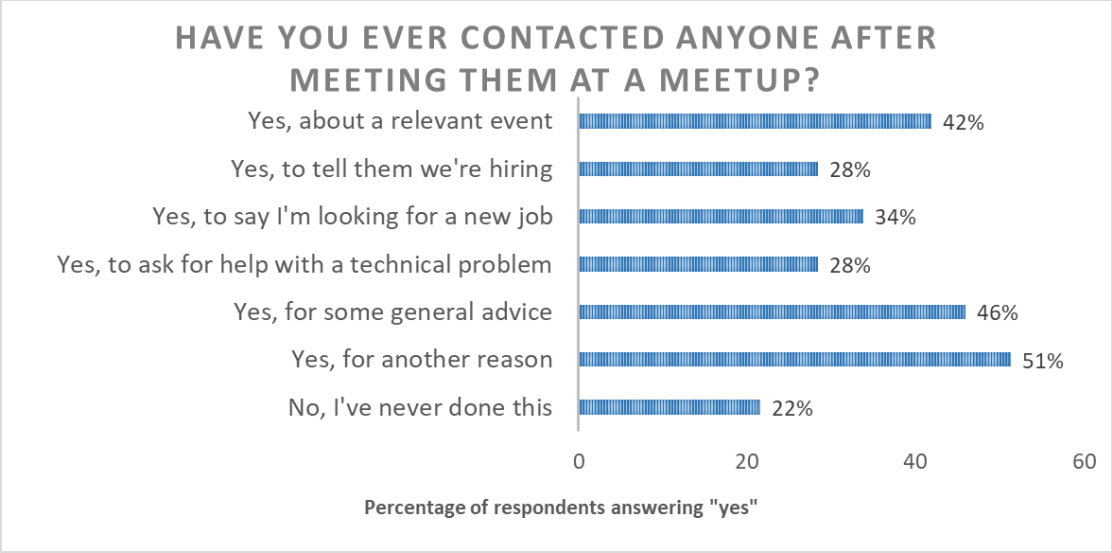

Figure 6 Survey responses showing reasons why participants contact people after meeting them at the meetup

Survey respondents were able to provide more information via an optional text box. Comments fell into the following categories:

- For social reasons, to make a friend (8 people)
- To offer help (5 people)
- To discuss future meetup events (5 people)
- To connect on social media (3 people)
- To follow up on work related contact (4 people)
- To discuss other events (2 people)
- To ask for additional information following an interesting talk or discussion (2 people)

DO MEETUPS ALLOW PROFESSIONALS TO ACCESS RESOURCES THAT ARE DIFFICULT TO ACCESS THROUGH OTHER MEANS?

Technology professionals have plenty of resources at their disposal for collecting information, such as webinars or online tutorials and training, social media channels like Slack and Twitter for asking questions and sharing news, and blogs for sharing insights into best practice. Meetups offer a chance to talk to peers with similar jobs, based in the same region, in a face-to-face setting. Does this offer something useful that cannot be obtained from other sources?

This is a difficult question to answer, but as a starting point, we tried to identify what features of local and face-to-face discussions meetup up leaders and participants particularly valued.

Survey participants were asked to rate their agreement with some statements about meeting face to face, using a five-point Likert scale. The statements were generated following informal chats with participants at meetups inside and outside our target regions, interviewing group leaders, and reading the available literature. Each statement was optional, meaning that respondents were not forced to provide a rating for every statement. Respondents were also offered an optional free text field to provide more details. The results are shown in Figure 7.

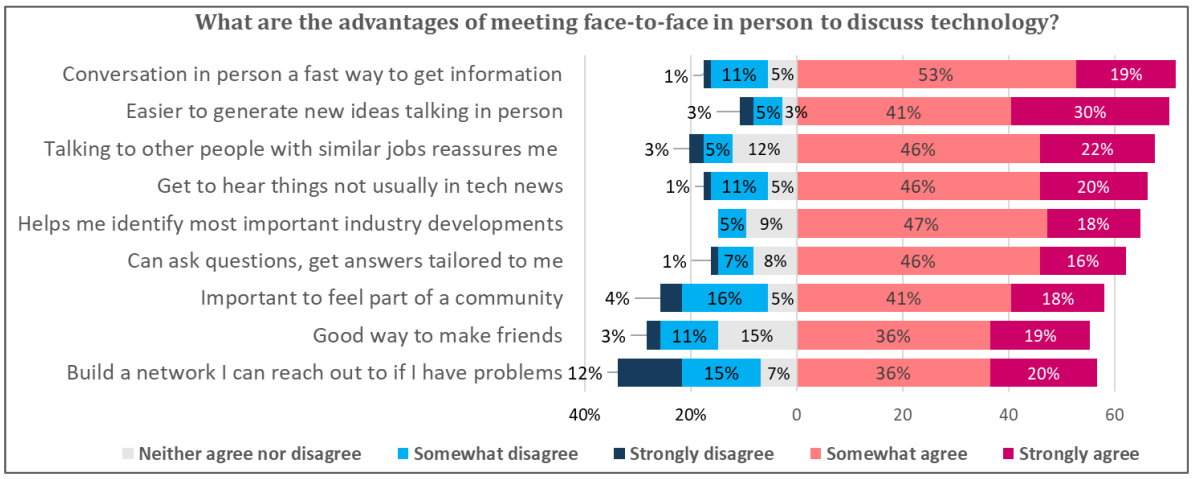

Figure 7 Results from survey respondents indicating what they saw as the advantages of face to face meetings

We asked interviewees their thoughts on what made face-to-face meetings particularly useful and whether it was important for meetups to have a regional focus. We draw on comments made by interviewees and on responses made via survey in the following sections to summarise our findings.

STORYTELLING AND REASSURANCE

Firstly, survey respondents agreed that conversation is a good way to obtain information. Five respondents provided more explanation in a free text comments box, explaining that they found it helpful hear what others were doing, what is actually used day-to-day in industry, and to learn from others' experiences. This was echoed in the comments made by interviewees, where the theme of

storytelling emerged as a valuable aspect of meetups; seven interviewees mentioned that hearing people's stories was useful. Telling "stories" is a common fixture for many meetups. For example, this may take the form of presentations or experience reports on how a major or complex project was delivered using a cutting edge technology or methodology.

Previous work studying communities of practice has identified storytelling and narrative as an important aspect of learning [1]. Presenting a "story" or experience report can be useful for imparting technical information which is, at the same time, embedded in rich contextual detail about the specifics of the problem domain, team dynamics, or changes that were required. Storytelling can be a useful tool for surfacing assumptions and contextual details, which in turn makes it easier to expose and share taken-for-granted implicit knowledge. One interviewee explained that talking to peers working on similar tasks in very different environments and organisations helped everyone to improve their understanding.

More than 66% of all survey respondents agreed that it was reassuring to hear about others' work. Four interviewees also raised this. Hearing "stories" about others' work is a valuable aspect of the meetup in this respect. One interviewee pointed out that some professionals can experience feelings of isolation, especially if they are the only specialist in a firm. Meetups can become an important mechanism for combating this, by providing friendly and reassuring contacts who have similar jobs. These aspects of meetings may be particularly helpful for professionals working in firms where the technical team is small, and there are few people available to discuss specialist technical solutions or share technology news. Smaller firms might therefore benefit from exploring ways to support technical staff who wish to attend relevant meetups, either as speakers or as participants.

CONVERSATION

Face to face conversation allows gaps in knowledge to be filled in, in a way that online interactions often don't. The ability to ask questions is obviously key; listeners can elicit key missing information to fill in gaps, ensuring that the information is ultimately tailored to their own needs. Almost all interviewees

HEARING STORIES

"A lot of the challenges that we face are actually quite similar, so, it's really interesting to ask a question 'how do you do this' to people who work in such different environments"

Meetup group leader

"You learn from the sessions. You hear other people's stories [...] from the angle of an engineer: this is how we set it up, this is how we overcome challenges., [...] stuff that everyone's experienced [...] That's the stuff that people want to hear."

Meetup group leader

"A lot of the time, it might just be either reassuring things that I know [...] And knowing that what you're doing is right, and everyone else is doing that as well [...] you're all heading in the same direction"

Meetup group leader

CONVERSATION

"Just to be able to have a conversation about it, rather than, you know, just a very tunnelled, back and forth online. Because, you know, conversations lead from one point to another, they're a lot broader [...] it gives you new ideas for your future projects."
Meetup group leader

IDEA GENERATION

"I think it's how we get more interesting stuff coming out of anywhere, sort of thing. Like, you end up with better ideas, and different ideas and newer ideas, the more kind of perspectives you have on things."
Meetup group leader

referred to the importance of being able to ask questions and several talked about their desire to encourage discussions and debates during meetings that they ran.

Five interviewees described how they go further to tailor information for their community, by connecting people with specific knowledge that is useful to them – such as putting someone in touch with just the right person, or disseminating events or recruitment information to relevant people.

IDEA GENERATION

The theme of generating new ideas from talking to other people is ranked quite highly by survey respondents. In fact, 70% of respondents agreed that meeting in person was good for generating new ideas.

This principle has also been thoroughly evidenced in previous research. People tend to generate ideas from the pool of information or knowledge to which they have access. Presenting a wider pool of knowledge can therefore make it possible to generate some new directions [15]. Numerous previous studies have found evidence that bringing in a more diverse range of perspectives results in better innovation. For example, more heterogeneous SME management teams [10, 16], diverse knowledge bases [7] and divergent thinking [6] have all been linked to firm growth. Similarly, collaborating with more partners that are different to ourselves or to each other can result in more innovative products [11] or increased innovation output [9, 12].

Meetup groups typically emphasise physically meeting new people, which means they are a potential forum for collecting new perspectives, because face-to-face interactions permit rich, context-ranging conversations upon which idea generation often depends. Some meetup communities have been specifically created to support ideas generation and innovation – for example, by connecting charities and social enterprises which have real requirements with software professionals, or by creating "mixer" events combining creatives and technologists.

The idea that informal, in-person meetings with other practitioners benefit idea generation is also supported by interviewees. Five interviewees identified that conversations at meetups were helpful for generating ideas, through talking to people with fresh or different perspectives.

COMMUNITY AND FRIENDSHIP

Survey respondents identified that feeling part of a community was important, although other aspects of meetups were more important. However, comments made by survey respondents on the principle of being welcoming, making friends and socialising together make clear that this is a major driver for technology-oriented Meetup communities. More than 10% of the survey respondents used the open text field on the survey to explain the importance of friendly meetings, and of being able to use groups to socialise. Meanwhile nine of the interviewees identified a sense of community as important. Sometimes this was seen as having a commitment to the group and returning regularly. Some interviewees explicitly wanted to put back into a community that had benefited them, and several interviewees described a sense of satisfaction from helping or mentoring younger group members. Almost every interviewee made comments about the importance of socialising, making friends and establishing a rapport.

These elements are clearly crucial for a meetup community, and something that is very difficult to replicate via alternative channels. Meeting regularly allows members to establish friendships, which increases the level of trust between those members. Trust is an important element when it comes to asking for advice on technical or career development topics.

SUMMARY

It's difficult to provide definitive evidence to answer the question: do meetups allow professionals to access resources that are difficult to access via other means? However, we tentatively suggest that our research shows that meetups offer the following benefits which are difficult to obtain from other sources:

- Locally-based friends with technical backgrounds, increasing the number of trusted people whom we can approach for advice
- Face-to-face conversations with experienced professionals in similar fields, which increase the chances that we will learn rich and complex lessons from others' experiences
- Local networks which broker the right connections and knowledge
- Reassurance from peers doing similar work

These benefits all appear to rely on having in-person meetings. As a result, individual meetup groups are naturally tied to a local area within which it's feasible for people to travel and meet. Local groups that meet regularly may play a role in facilitating regional "buzz" – the atmosphere of ideas and news, planned and accidental local meetings, and continuous updates and learning opportunities, which arises when there is a cluster of firms with similar interests in the same region [2]. Alongside buzz, meetings can also provide a useful form of "pipeline" for bringing new ideas and experiences into a region – for example, by inviting speakers from outside the region to give talks.

WHAT DO PARTICIPANTS WANT IN A MEETING?

Finally, we also asked survey respondents what features they thought worked well for meetings. Respondents added their own comments on what they thought worked well at meetup events. We grouped their comments roughly into five categories, which we describe in the following sections.

PURPOSE

Four respondents added comments on the need for a meetup to have a clear purpose, focus and agenda. They suggested that, to be useful and successful, a meetup community should not be trying to compete with another community. Successful groups need a clear vision of what the group will offer.

A few respondents added comments expressing concerns that groups could become overly commercial in focus. This sentiment was also echoed by some of the group leaders. For example, two of the interviewees expressed concerns that "experience report" type presentations were sometimes at risk of becoming sales pitches for the presenter. They felt that this would be at odds with the expectations of the participants, who were giving up their free time in order to learn new technical content or improve their practice.

CONTENT

Six respondents wrote additional comments about the content of the meetup. Some commenters wrote about the importance of content on a wide variety of topics, including career development topics such as team working or productivity, as well as technical content.

Quality content is a high priority for most of the group leaders, regardless of whether their meetings offered scheduled talks or another type of format such as discussion groups or workshops. Of those interviewees who run groups with presentation-oriented meeting formats, many had at some stage experienced difficulties in locating a constant stream of new speakers. This tended to get easier for more mature groups which had had enough time to grow their membership, or for those groups affiliated with a national network or corporate partner who helped to schedule speakers.

CREATING A WELCOMING CULTURE

Seven survey respondents added comments in this category. They emphasised the importance of greeting participants, making them feel welcome, and reassuring anxious attendees. One respondent pointed out that many people attend meetings alone, so running icebreakers can help by making it easier to start a conversation.

Other comments from survey respondents emphasised making meetings inviting and fun. Several comments addressed the importance of welcoming participants at different career levels, and not making meeting attendees feel bad for not being an expert.

WHAT MAKES A SUCCESSFUL MEETUP GROUP?

Clearly focussed (and communicated as such)

Everyone made to feel welcome

No such thing as a stupid question

Regular schedule of events

Ease of access

Diverse attendees and experts

Encouragement for new speakers

Random days and dates tend to make it more difficult to attend

Ensuring a mix of people

Comments from Meetup group participants

DIVERSITY

Four survey respondents added comments along the theme of diversity. Commenters emphasised the importance of welcoming a mix of people. Ensuring a diverse range of speakers requires giving encouragement. Commenters also pointed out small details that can matter, such as assuming that all participants want to drink alcohol, or shaking the hands of male speakers but not of female speakers.

The emphasis on diversity is an issue that is also on the minds of many group leaders. During interviews, several group leaders expressed that booking a diverse range of speakers was a priority for their group, but that finding a diverse range of people who were willing to present was a challenge. Multiple interviewees had gone out of their way to identify and encourage speakers from under-represented groups.

VENUE

Nine respondents added comments to indicate that the choice of venue was important. Locations should be easy to find and meetings scheduled on regular days. Several commenters mentioned food and drink for creating a social atmosphere. Start times need to accommodate those travelling from outlying areas.

Practical topics were also raised by many group leaders. Nine of the group leaders we interviewed (three quarters) had experienced difficulties at some stage with obtaining an appropriate venue, setting a start time that suited everyone, and/or getting catering right. Very many interviewees mentioned the difficulty of catering appropriately, because the number of participants is difficult to predict accurately; many groups experience relatively high levels of no-shows, as well as attendees who have not indicated their intention to come along.

CONCLUDING REMARKS

This study is one of the world's first to attempt to understand the growing phenomenon of local informal meetings for technology professionals and the role that they play in the software development industry.

We found that the community attending local meetings tended to be experienced technology practitioners. Although groups spanned a wide variety of different technology topics, the most popular groups by some margin are still those which focus on programming, specific languages and general software development.

We found that technology professionals are largely motivated to attend relevant meetups by a variety of factors, with the need to learn new material, stay up to date and develop new skills being particularly important. There's also evidence that professionals actively use meetups to build out a network of local contacts. Three quarters of respondents to our survey have contacted someone they met at a meetup, for a variety of reasons which includes sharing information about other meetups or other events, to share or acquire information about jobs, or to get advice and/or technical help. The meetups provide useful information: 80% of respondents to our survey have followed up on something they learned at a meetup, or learned things that enabled them to improve their general practice.

We are interested in understanding whether informal local meetings can provide resources or information that is not available via other means, particularly since technology professionals typically have access to vast online resources such as webinars, blogs, social media and forums. We suggest that they do. Examples provided by our interviewees suggest that informal local meetings are particularly helpful for sharing complex lessons acquired from experience, which is important when it comes to mastering complex activities such as requirements elicitation and effective team working. Previous researchers have also suggested that this type of applied, experience-based knowledge is difficult to share except through meeting (or working with) others in face to face settings.

A clear message that emerged from our interviews and our surveys was the importance of having friends with similar technical interests, and a friendly, welcoming environment. Our participants and respondents also suggested that they liked to hear each other's "stories" (as long as this did not become a sales pitch). Hearing about others' experiences can provide a reassuring message about shared challenges and about the validity of one's own approach. For this reason, technology meetups might be a particularly useful resource for professionals working alone or in very small technical teams, where there are fewer internal opportunities to discuss specialist solutions or technologies with experienced peers.

Further research is needed to understand the role that meetups can play in individual regions, such as whether they can play a role in building up local specialisms or supporting start-ups.

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APPENDIX: LIST OF MEETUP GROUPS INCLUDED IN THE STUDY POPULATION

MEETUP GROUP NAME	NO. OF MEMBERS[6]	NEAREST STUDY LOCATION[7]
Brighton CTO Meetup	142	Brighton
SAFE Network: Brighton	33	Brighton
Functional Brighton	454	Brighton
WordUp Brighton	581	Brighton
Brighton Mobile	406	Brighton
Brighton (Ethical) Hacker Meetup / The Hacker Lab	97	Brighton
Brighton Data Forum	280	Brighton
Sussex Data Science Meetup	254	Brighton
Brighton DevOps, Dev and Test Gathering	846	Brighton
ProductTank Brighton	759	Brighton
Brighton Web Development Meetup	584	Brighton
Lean Agile Brighton	545	Brighton
BUUG - Brighton Unity User Group	238	Brighton
Brighton Python	50	Brighton
WorthingDigital,	644	Brighton
Laravel and Lager Brighton	45	Brighton
Flock	68	Brighton
Brighton SharePoint Office 365 and Azure Meetup	61	Brighton
Make AI Happen Brighton	99	Brighton
Data Visualisation Brighton	848	Brighton
Make AI Happen Haywards Heath	182	Brighton
Brighton Java	863	Brighton
Ministry of Testing - Brighton and Hove	619	Brighton
Brighton / Worthing Angular2+ Meetup	68	Brighton
Horsham Web Development Meetup.,	29	Brighton
Brighton Blockchain Meetup	172	Brighton
.NET South East	421	Brighton
BrightonAnalytics	137	Brighton
Brighton Ruby Group	222	Brighton
Glasgow Data Science #ODSC	316	Glasgow
Ladies of Code (Glasgow)	654	Glasgow
Scottish Ethereum Meetup	61	Glasgow
Lean Agile Glasgow	1449	Glasgow

[6] Number of members in a group changes continually. These figures are correct at time of data extraction, May-June 2019.

[7] Groups were selected on the basis that they were within 25 miles of one of the following five urban study areas: Brighton; Glasgow; Liverpool; Newcastle; and Peterborough. The set of groups that fell inside these distances was determined by Meetup's algorithm.

MEETUP GROUP NAME	NO. OF MEMBERS	NEAREST STUDY LOCATION
Bitcoin/Crypto/Blockchain Meetup - @TheCryptograph	246	Glasgow
Glasgow WordPress Meetup	567	Glasgow
Python Glasgow	1056	Glasgow
Transport Cafe	14	Glasgow
Videogames Glasgow	697	Glasgow
DevOps Glasgow,	755	Glasgow
Glasgow Coding Meetup	250	Glasgow
Ceridian Business & Technology Social Scotland	197	Glasgow
GlasgowPHP	436	Glasgow
Amazon Web Services User Group Glasgow,	756	Glasgow
Cloud Native Glasgow,	350	Glasgow
Glasgow AI	1137	Glasgow
Glasgow Clojurians Meetup	124	Glasgow
Hacks/Hackers Scotland,	73	Glasgow
Scottish SharePoint and Office 365 User Group	55	Glasgow
R Glasgow	84	Glasgow
GDG Glasgow,	259	Glasgow
Glasgow Tech Social	800	Glasgow
Glasgow Graph Databases,	59	Glasgow
Glasgow Umbraco Users Group (GLUUG),	222	Glasgow
UNDERSTANDING CRYPTO AND HOW TO TRADE	153	Glasgow
Glasgow SQL User Group,	326	Glasgow
Glasgow Internet of Things	1511	Glasgow
Glasgow Apache Kafkaa Meetup by Confluent,	48	Glasgow
Scottish PowerShell & DevOps User Group (@ScotPSUG)	74	Glasgow
Legal Hackers Scotland	446	Glasgow
Vue.js // Glasgow Meetup	129	Glasgow
Ministry of Testing Glasgow	613	Glasgow
Glasgow JavaScript	603	Glasgow
AWS User Group Liverpool,	125	Liverpool
Chester Devs	1232	Liverpool
Internet of Things Liverpool	747	Liverpool
Lancashire SEO Meetup	52	Liverpool
WordPress Liverpool	52	Liverpool
Google Developer Group Liverpool	895	Liverpool
Merseycode	581	Liverpool
Liverpool Atlassian User Group	84	Liverpool
Code Nation Chester	82	Liverpool
North West Bitcoin Meetup	311	Liverpool
Immersive Liverpool	271	Liverpool
The Liverpool Software Developers Meetup | Yozu	372	Liverpool

MEETUP GROUP NAME	NO. OF MEMBERS	NEAREST STUDY LOCATION
Dot NET Liverpool	251	Liverpool
Analytics At Speed Liverpool	51	Liverpool
Liverpool Java User Group	20	Liverpool
Liverpool Machine Learning and AI	293	Liverpool
Chester Data Insights	107	Liverpool
CodeUp Chester	581	Liverpool
Liverpool Magento Group	102	Liverpool
Southport Software Dev Meetup	69	Liverpool
Lean Agile Warrington	730	Liverpool
Liverpool Umbraco Meetup	223	Liverpool
Liverpool Tester Gathering	1061	Liverpool
Blockchain technology and future of payments	160	Liverpool
ExpertTalks Liverpool	168	Liverpool
WA Games	159	Liverpool
Bolton SEO (Search Engine Optimization) Meetup	50	Liverpool
Liverpool Futurists	170	Liverpool
CodeUp Wigan	298	Liverpool
Rubyside	61	Liverpool
North West Tech Talks	381	Liverpool
CodeUp Liverpool	164	Liverpool
Liverpool Software Architecture Meetup	170	Liverpool
R-Ladies Liverpool	58	Liverpool
Momentum Meetup	281	Liverpool
Adventures in R Meetup	124	Newcastle
Newcastle Upon Tyne Practical Agile Meetup	385	Newcastle
NE Unity User Group	135	Newcastle
Golang North East	385	Newcastle
PHP North East	171	Newcastle
Game Dev Newcastle	311	Newcastle
Sunderland Digital	525	Newcastle
OWASP Newcastle Chapter	111	Newcastle
HaintonDotNet - North East	317	Newcastle
AWS User Group - North East England,	434	Newcastle
R-Ladies Newcastle	119	Newcastle
North East England Qlik & Business Intelligence Meetup	97	Newcastle
Newcastle Upon Tyne Agile Testing Meetup	279	Newcastle
Ministry of Testing Newcastle	328	Newcastle
Newcastle Upon Tyne Data Science Meetup	542	Newcastle
Ladies of Code (Newcastle)	343	Newcastle
North East Azure User Group,	173	Newcastle
Agile Business Analysis Community	266	Newcastle

MEETUP GROUP NAME	NO. OF MEMBERS	NEAREST STUDY LOCATION
WordPress North East	1128	Newcastle
Doyenne Coders	143	Newcastle
NE:Tech	109	Newcastle
Agile North East	1795	Newcastle
Blockchain North East	369	Newcastle
Functional Programming North East	44	Newcastle
Newcastle Upon Tyne Internet of Things Meetup	451	Newcastle
Newcastle Data Platform and Cloud (DPaC),	108	Newcastle
Tech4Good Newcastle	316	Newcastle
Hacks/Hackers NE England,	58	Newcastle
Serverless North East,	93	Newcastle
Social Tech North East	49	Newcastle
GDG Cloud Newcastle-Northeast	338	Newcastle
Testing Folks (Newcastle) Meetup	318	Newcastle
DevOps North East (D.O.N.E.),	1062	Newcastle
Newcastle Upon Tyne Atlassian User Group Meetup	48	Newcastle
in_collusion: King's Lynn arts , technology meetup	199	Peterborough
Optimisey - The Cambridge SEO Event	539	Peterborough
CW Events	183	Peterborough
Cambridge Software Crafters	864	Peterborough
.NET Cambridge	803	Peterborough
Ministry of Testing Peterborough	274	Peterborough
BA Crowd Peterborough	159	Peterborough
Agile Peterborough	788	Peterborough
Digital People in Peterborough (DPiP)	788	Peterborough
PHP Cambridge	281	Peterborough
Peterborough .NET Meetup	83	Peterborough
in_collusion: Huntingdon arts technology meetup	204	Peterborough

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